

Calculator Model:

Name	Index Number	Class
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WOODGROVE SECONDARY SCHOOL

A SCHOOL OF CHOICE. A COMMUNITY OF DYNAMIC LEARNERS

END-OF-YEAR EXAMINATION 2020

LEVEL & STREAM : SECONDARY 1 EXPRESS

SUBJECT : MATHEMATICS

DATE (DAY) : 6 OCTOBER 2020 (TUESDAY)

DURATION : 2 HOURS 15 MINUTES

SBB

Section A

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs, tables or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **ALL** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

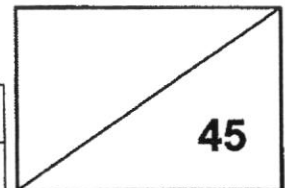
The number of marks is given in brackets [] at the end of each question or part question.

There are 2 sections in this paper and the total number of marks is 90.

SECTION A (45 MARKS)

DO NOT TURN OVER THE QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.

Student's Signature		Parent's Signature	
Date		Date	



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 Setter : Mdm Tan Hwee Lin

3

Answer all the questions.

- 1 (a) Express 360 as a product of its prime factors.

Answer [2]

- (b) Find the smallest positive integer k such that $360k$ is a perfect cube.

Answer [2]

- 2 A list of numbers are shown below.

$$36, -0.025, \frac{3}{7}, \frac{-\sqrt{7}}{\sqrt{7}}, \frac{4\pi}{2}, 0.7i$$

From the list, write down

- (a) a negative integer.

Answer [1]

- (b) a perfect square.

Answer [1]

- (c) irrational number(s).

Answer [1]

4

3 (a) Estimate the following to 2 significant figures.

(i) 25 956

Answer [1]

(ii) 4010

Answer [1]

(iii) 0.0502

Answer [1]

(b) Hence, estimate the value of $\frac{25\,956 + 4010}{0.0502 \times 100}$ to 1 significant figure.

Answer [2]

4 (a) Factorise $xq - yq + zq$.

Answer [1]

(b) Hence, find the value of $39 \times 70 - 12 \times 70 + 73 \times 70$.

Answer [2]

5

5 (a) Simplify

(i) $2(m-5)-m,$

Answer [2]

(ii) $\frac{(a-b)}{3} + \frac{(a+2b)}{4}.$

Answer [3](b) Factorise completely $3p(q-1)+p(q-1).$ *Answer* [2]

6 The first four terms of a sequence are 7, 12, 17 and 22.

(a) Write down the next term of the sequence.

Answer [1](b) Find an expression, in terms of n , for the n^{th} term of the sequence.*Answer* [1](c) One term in the sequence is 252. Find the value of n for this term.*Answer* [2]

(d) Explain, with a reason, is 200 is in the sequence?

Answer

[2]

6

- 7 Joshua cycled $\frac{3}{4}$ of his journey at 12 km/h. He then decreased his speed by 3 km/h to complete the remaining journey in 2 h.

(a) What was the total distance traveled by Joshua?

Answerkm [2]

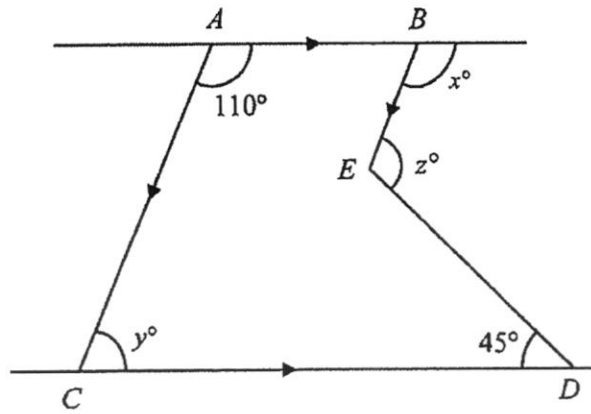
(b) How long did Joshua take to travel the whole journey?

Answerh [3]

(c) What was Joshua's average speed for the whole journey?

Answerkm/h [2]

8



In the diagram, the straight line AB is parallel to CD and AC is parallel to BE .
 Given $\angle CAB = 110^\circ$ and $\angle EDC = 45^\circ$, calculate the value of

(a) x ,

Answer $x = \dots\dots\dots$ [1]

(b) y ,

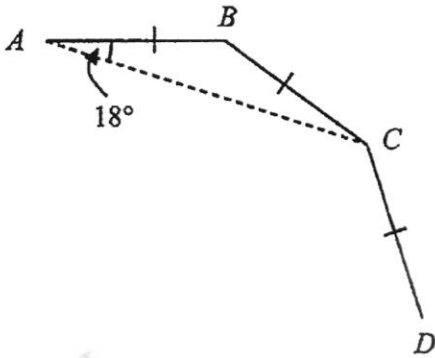
Answer $y = \dots\dots\dots$ [1]

(c) z

Answer $z = \dots\dots\dots$ [3]

8

9



AB , BC and CD are adjacent sides of a regular polygon and $\angle CAB = 18^\circ$. Find

(a) $\angle ABC$,

Answer $\angle ABC = \dots\dots\dots^\circ$ [2]

(b) the number of sides of the polygon,

Answer $\dots\dots\dots$ [2]

(c) $\angle ACD$.

Answer $\angle ACD = \dots\dots\dots^\circ$ [1]

END OF SECTION A

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Section B

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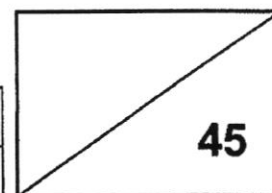
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SECTION B (45 MARKS)

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3

Answer **all** the questions.

- 10** Blessed Organisation plans to donate 440 packs of biscuits, 320 canned food and 200 kg of rice to the old folks' home. The maximum number of packs of biscuits, canned food and rice are to be placed equally in gift bags before the donation.

(a) How many gift bags are needed?

Answer gift bags [2]

(b) How many of each items are there in each gift bag?

Answer packs of biscuits
 canned food
 kg of rice [3]

- 11** Without the use of a calculator, evaluate $[(17 - 11) + 20 \div 4] \times (-2)^2$.
 Show your working.

Answer [3]

12 (a) Simplify and factorise completely each of the following expressions.

(i) $3pq + 9p$

Answer [1]

(ii) $3nx + 36mx - 15mx$

Answer [2]

(b) Solve $\frac{5}{x+3} = \frac{7}{2x}$.

Answer [3]

5

13 Danial is x years old. His brother Danish is 6 years younger than him. His father is 3 times as old as Danial. Write an algebraic expression in terms of x for

(a) Danish's age,

Answer [1]

(b) his father's age.

Answer [1]

The sum of Danial's and Danish's age are 30.

(c) Write down an equation in x to represent this information, and show that it reduces to $2x - 6 = 30$.

Answer

[2]

(d) Solve the equation $2x - 6 = 30$.

Answer $x =$ [2]

6

14 This is the table of values for the line $y = 2x + 1$.

x	0	1	2	3	4
y	1				

(a) Complete the table above for the line $y = 2x + 1$. [2]

(b) On the grid opposite, draw the graph of $y = 2x + 1$ for $0 \leq x \leq 4$. [2]

(c) State the y -intercept of the line $y = 2x + 1$.

Answer [1]

(d) Use your graph to find the value of x when $y = 2$.

Answer $x =$ [1]

(e) On the same grid, draw the line $y = 3$ and label it. [1]

(f) Write down the gradient of $y = 3$.

Answer [1]

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EDUCATION

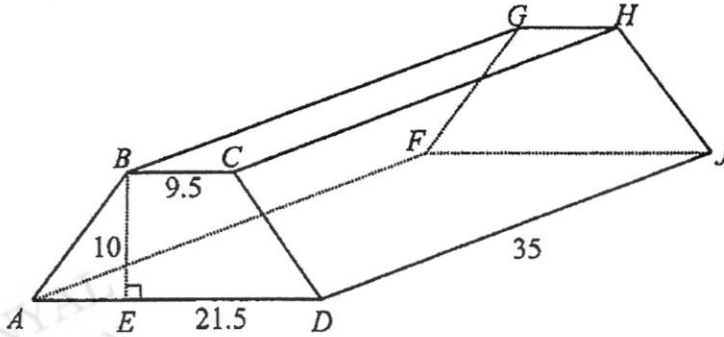
DANYAL
EDUCATION

DANYAL
EDUCATION

DANYAL
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DANYAL
EDUCATION

- 15 The diagram shows a solid metallic prism whose cross-section is a trapezium $ABCD$. $BE = 10$ cm, $BC = 9.5$ cm, $AD = 21.5$ cm and $DJ = 35$ cm. BC is parallel to AD .



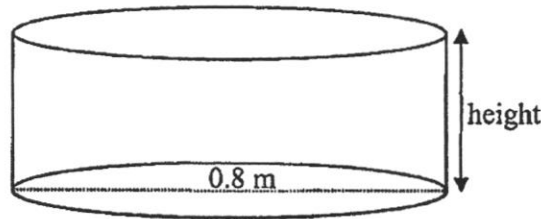
- (a) Find the area of trapezium $ABCD$.

Answercm² [2]

- (b) Hence, find the volume of the prism.

Answercm³ [1]

50 identical prisms were melted and poured into an open cylindrical tank with a diameter of 0.8 m, as shown in the diagram below. Take $\pi = 3.142$.



- (c) If all the melted prisms could fill the tank completely, find the height of the tank.

Answercm [4]

10

- (d) The external curved surface of the tank is coated with a protective layer.
Find the area of this protective layer.

Answercm² [2]

- 16 Construct $\triangle ABC$ such that $AB = 10$ cm, $\angle BAC = 75^\circ$ and $\angle ABC = 50^\circ$ in the space provided below. Measure and write down the length of AC .

Answer $AC =$ cm [3]

17 Mr Tan brought his family for lunch in a restaurant. The receipt is as shown below.

(S) Reg No: M2-0126393-0	
TABLE: r20	Rachel
Pax: 4	OP: POS: POS021
POS Title: Cashier	18/07/2020 17:57
Rcpt#: B20000031248	
----- DINE IN -----	
2 Cold Green Tea	\$2.40
1 Warm Plain Water	\$0.50
1 Fried Salmon Kama	\$4.00
1 Sashimi Salad	\$9.90
* 1 **Dressing: Sushi Tei	
* **Wafuu Dressing	
1 Hanasaki Ika Tem	\$6.30
1 Katsu Cha Soba	\$14.50
1 Chirashi Don	\$10.80
1 Hanasaki Ika Tem	\$6.30
1 Katsu Don	\$10.80

SUBTOTAL	
10% Syr Chrg	\$6.55
7% GST	\$5.04

TOTAL	\$77.09

UOB Credit Card	\$77.09
Signature: _____	

Closed Bill	
18/07/2020 18:52	
TEL: 6257 2822	

Thank you See you again! *****	

- (a) The receipt shows the 7% GST amount is \$5.04.
Show how this amount is calculated.

Answer

12

- (b) The total amount \$77.09 is printed on the receipt.
Show how this amount is calculated.

Answer

- (c) Mr Tan thinks that additional charges (service charge and GST) is 17%.
Do you agree? Explain with working.

Answer

END OF SECTION B

[2]

[1]

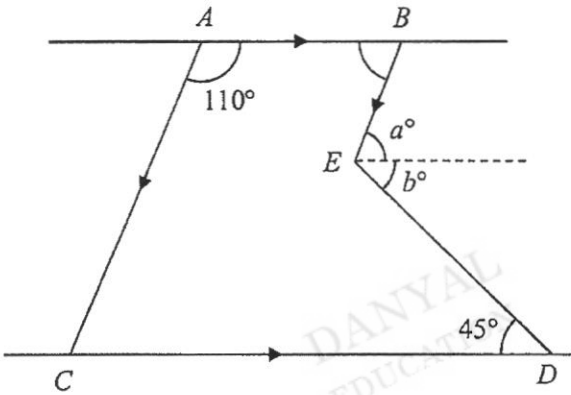
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 Sec 1 Express EOY E.Maths 2020 Section A Marking Scheme Setter: Tan Hwee Lin

Q	Solution	
1(a)	$\begin{array}{r l} 2 & 360 \\ 2 & 180 \\ 2 & 90 \\ 5 & 45 \\ 3 & 9 \\ & 3 \end{array}$ $360 = 2^3 \times 3^2 \times 5$	M1 A1
(b)	$k = 5^2 \times 3$ $= 75$	M1 A1
2 (a)	$\frac{-\sqrt{7}}{\sqrt{7}}$	B1
(b)	36	B1
(c)	$\frac{4\pi}{2}$	B1
3 (ai)	26 000	B1
3 (aii)	4000	B1
3 (aiii)	0.050	B1
3(b)	$\frac{25\,956 + 4010}{0.0502 \times 100} = \frac{26000 + 4000}{0.050 \times 100}$ $= 6000$	M1 A1
4 (a)	$xq - yq + zq = q(x - y + z)$	B1
4 (b)	$39 \times 70 - 12 \times 70 + 73 \times 70 = 70(39 - 12 + 73)$ $= 70(100)$ $= 70\,00$	M1 A1
5 (ai)	$2(m - 5) - m = 2m - 10 - m$ $= m - 10$	M1 A1
5(aii)	$\frac{(a-b)}{3} + \frac{(a+2b)}{4} = \frac{4(a-b)}{12} + \frac{3(a+2b)}{12}$ $= \frac{4a - 4b + 3a + 6b}{12}$ $= \frac{7a + 2b}{12}$	M1 M1 A1
5(b)	$3p(q-1) + p(q-1) = (q-1)(3p+p)$ $= 4p(q-1)$	M1 A1
6(a)	27	B1

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6(b)	$5n + 2$	B1
6(c)	$T_n = 5n + 2$ $252 = 5n + 2$ $5n = 250$ $n = 50$	M1 A1
6 (d)	No $T_n = 5n + 2$ $200 = 5n + 2$ $n = 39.6$ n has to be an integer. Thus not possible for 200 to be a term. Or $200 = 5n + 2$ $5n = 198$ 198 is not a multiple of 5, thus it is not possible for 200 to be a term.	B1 B1
7 (a)	$\frac{1}{4}$ of the journey $= (12 - 3) \times 2$ $= 18 \text{ km}$ Total journey $= 18 \times 4$ $= 72 \text{ km}$	M1 A1
7(b)	$72 \times \frac{3}{4} = 54$ Time for the first $\frac{3}{4}$ journey $= 54 \div 12$ $= 4\frac{1}{2} \text{ h}$ Total time $= 2 \text{ h} + 4\frac{1}{2} \text{ h}$ $= 6\frac{1}{2} \text{ h}$	M1 M1 A1

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7(c)	$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$ $= \frac{72}{6.5}$ $= 11.1 \text{ km/h or } 11\frac{1}{13} \text{ km/h}$	M1 A1
8(a)	$x = 110$ (corresponding \angle s, $BE \parallel AC$)	B1
8b	$\angle ACD + 110^\circ = 180^\circ$ (int. \angle s, $AB \parallel CD$) $y = 70$	B1
8(c)	 <p>Draw a line passing through E, parallel to AB and CD.</p> $a^\circ = 70^\circ \text{ (alt. } \angle\text{s)}$ $b^\circ = 45^\circ \text{ (alt. } \angle\text{s)}$ $z = 70 + 45$ $= 115$	M1 M1 A1
9(a)	$\angle ABC = 180^\circ - 18^\circ - 18^\circ$ (\angle sum of Δ) $= 144^\circ$	M1 A1
9(b)	$\text{Size of exterior angle} = 180^\circ - 144^\circ$ $= 36^\circ$ $\text{Number of sides} = \frac{360^\circ}{36^\circ}$ $= 10$	M1 A1

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	OR $\frac{(n-2) \times 180}{n} = 144$ $180n - 360 = 144n$ $36n = 360$ $n = 10$	M1 A1
9(c)	$\angle ACD = 144^\circ - 18^\circ$ $= 126^\circ$	B1

END OF MARKING SCHEME

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Q	Solution																	
10(a)	<p>a) Maximum number of gift bags = HCF of 440, 320 and 200</p> <p>Repeated division with prime factors or individual prime factorisation.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 10px;">10</td> <td style="border-left: 1px solid black; padding-left: 5px;">440</td> <td style="border-left: 1px solid black; padding-left: 5px;">320</td> <td style="border-left: 1px solid black; padding-left: 5px;">200</td> </tr> <tr> <td>2</td> <td style="border-left: 1px solid black; padding-left: 5px;">44</td> <td style="border-left: 1px solid black; padding-left: 5px;">32</td> <td style="border-left: 1px solid black; padding-left: 5px;">20</td> </tr> <tr> <td>2</td> <td style="border-left: 1px solid black; padding-left: 5px;">22</td> <td style="border-left: 1px solid black; padding-left: 5px;">16</td> <td style="border-left: 1px solid black; padding-left: 5px;">10</td> </tr> <tr> <td></td> <td style="border-left: 1px solid black; padding-left: 5px;">11</td> <td style="border-left: 1px solid black; padding-left: 5px;">8</td> <td style="border-left: 1px solid black; padding-left: 5px;">5</td> </tr> </table> <p>HCF = $10 \times 2 \times 2$ $= 40$</p>	10	440	320	200	2	44	32	20	2	22	16	10		11	8	5	M1 A1
10	440	320	200															
2	44	32	20															
2	22	16	10															
	11	8	5															
10(b)	<p>Number packs of biscuits in each bag = 11 Number of can food in each bag = 8 Weight of rice in each bag = 5 kg</p>	B1 B1 B1																
11	$[(17 - 11) + 20 \div 4] \times (-2)^2 = [(6) + 5] \times (4)$ $= (11) \times (4)$ $= 44$	M1 M1 A1																
12(ai)	$3pq + 9p = 3p(q + 3)$	B1																
12(aii)	$3nx + 36mx - 15mx = 3nx + 21mx$ $= 3x(n + 7m)$	M1 A1																
12(b)	$\frac{5}{x+3} = \frac{7}{2x}$ $5(2x) = 7(x+3)$ $10x = 7x + 21$ $10x - 7x = 21$ $3x = 21$ $x = 7$	M1 M1 A1																
13(a)	Danish's age = $(x - 6)$ years	B1																
13 (b)	Danial's father's age = $3x$ years	B1																
13(ci)	<p>Danial's age + Danish's age = 30</p> $x + (x - 6) = 30$ $2x - 6 = 30 \text{ (Shown)}$	M1 A1																
13(cii)	$2x - 6 = 30$ $2x = 36$ $x = 18$	M1 A1																

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14(a)	<table border="1"> <tbody> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>y</td> <td>1</td> <td>3</td> <td>5</td> <td>7</td> <td>9</td> </tr> </tbody> </table>	x	0	1	2	3	4	y	1	3	5	7	9	B2
	x	0	1	2	3	4								
y	1	3	5	7	9									
Any 2 right answers = 1 mark														
14(b)	Correct coordinates Correct joining of points and drawing of the straight line	B1 B1												
14(c)	$y = 1$	B1												
14(d)	$x = 0.5$	B1												
14 (e)	Refer to graph paper	B1												
14 (f)	Gradient = 0	B1												
15(a)	$\text{Area of Trapezium } ABCD = \frac{1}{2} \times (21.5 + 9.5) \times 10$ $= \frac{1}{2} \times 31 \times 10$ $= 155 \text{ cm}^2$	M1 A1												
	volume of one prism = 155×35 $= 5425 \text{ cm}^3$	B1												
15 (c)	$\text{Volume of 50 prisms} = 50 \times 5425$ $= 271\,250 \text{ cm}^3$	M1												
	$\text{Radius of prism} = 0.8 \div 2$ $= 0.4 \text{ m}$ $= (0.4 \times 100) \text{ cm}$ $= 40 \text{ cm}$ <p>Let the height of the tank be h cm.</p> <p>Since the melted prisms could fill the tank completely,</p> $\text{volume of tank} = 271\,250 \text{ cm}^3$ $3.142 \times 40^2 \times h = 271\,250$ $h = \frac{271\,250}{3.142 \times 40^2}$ $h = 53.956$ $h = 54.0 \text{ (Correct to 3 sig. fig.)}$	M1 M1 A1												

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15 (d)	Curved surface area of tank = $2 \times 3.142 \times 40 \times 53.956$ $= 13562.38$ $= 13600(3s.f)$ OR Curved surface area of tank = $2 \times 3.142 \times 40 \times 54.0$ $= 13578.44$ $= 13600(3sf)$ **If using exact value of h (from part c), accept curved surface area as <u>13562.5</u> (exact value)	M1 A1 M1 A1
16	Refer to attachment	B3
17(a)	10% rep \$6.55 100% rep \$65.50 7% rep $(65.50 + 6.55) \times 7\%$ [M1 for $(65.50 + 6.55)$] $= 72.05 \times 7\%$ $= 72.05 \times \frac{7}{100}$ $= 5.0435$ $= \$5.04$ (2 d.p.) Accept when students add all the individual items to get 100%.	M1 A1
17(b)	Total amount of the bill $= 72.05 \times 107\%$ $= 72.05 \times \frac{107}{100}$ $= 77.0935$ $= \$77.09$ (2 d.p.) OR Total amount of the bill $= 72.05 + 5.04$ OR $= 65.50 + 6.55 + 5.04$ $= \$77.09$ (2 d.p)	M1 A1 M1 A1
17 (c)	Total amount $= 65.50 \times 1.17$ $= \$76.635 \neq \77.09 Mr Tan is incorrect.	B1

END OF MARKING SCHEME